APPENDIX N – PRELIMINARY ENVIRONMENTAL ASSESSMENT REPORT SAMPLE

Preliminary Environmental Assessment Report

[Site Designation]
[Site Address or Major Cross Streets]
[City], California [Zip Code]
[Site Code]

Prepared for:
[School District]
[District Office Address]
[City], California [Zip Code]

Prepared by:
[Consultant Company]
[Office Address]
[City], California [Zip Code]

[Date of Report]

EXECUTIVE SUMMARY

The executive summary should summarize the main information presented in the Preliminary Environmental Assessment Report. It should include, but not be limited to, the following information:

- Purpose of the Preliminary Environmental Assessment Report
  - Identification of areas of concern being addressed. The areas of concern should be based on recognized environmental concerns identified in the Phase I report or after review of information consistent with a Phase I.
  - Identification of the technical memorandum or workplan used to guide the assessment.
- School district
- Site designation consistent with information submitted to the California Department of Education
- Site location
  - Street address or nearest cross streets
  - City and county
- Site description
  - Size of the site (preferably in acres)
  - Current and historical business activity conducted on site
- Type of school site – proposed, expansion, or existing
- Type of school proposed – grade levels of students
- Number of classrooms and students
- Intended use of the site – whether all or a portion of the site will be used
- Brief summary of findings of assessment
- Conclusions
- Recommendations

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ABBREVIATIONS AND ACRONYMS

Abbreviation or acronym | Description

1.0 INTRODUCTION

The introduction should introduce the site, present the organization of the report, and include the following information:

- School district
- Site designation consistent with information submitted to the California Department of Education
- Site location
    - Street address or nearest cross streets
    - City and county
- Type of school site – proposed, expansion, or existing
- Type of school proposed – grade levels of students
- Number of classrooms and students
- Intended use of the site – whether all or a portion of the site will be used
- Proposed disposition of existing structures
- Proposed source of potable and non-potable water supply

The introduction should also identify recognized environmental conditions that lead to the recommendation for further investigation and the reason for preparing a Preliminary Environmental Assessment (PEA) Report which may include:

- A Phase I report was submitted for DTSC review and approval and DTSC provided a determination that a PEA is required to determine one or more of the following (Ed. Code, § 17213.1, subd. (a)):
    - If a release of hazardous material has occurred and, if so, the extent of the release.
    - If there is the threat of a release of hazardous materials.
    - If a naturally occurring hazardous material is present.
- Based on review of information consistent with a Phase I there is the potential for a release of hazardous materials or presence of naturally occurring hazardous materials. As a result, the school district has elected to proceed directly to a PEA (Ed. Code, § 17213.1, subd. (a)).

This section should reference the PEA Technical Memorandum or Workplan approved by DTSC, including the document title, author, date of preparation, and date of the approval letter forwarded by DTSC.

1.1 PURPOSE

This section should state the purpose of the PEA, part of the second step of the environmental review process for school sites, with respect to recognized environmental conditions identified for the site. Specifically for school sites, the objective of the PEA is to determine whether current or past hazardous material management practices or waste management practices have resulted in a release or threatened release of hazardous materials, or whether naturally occurring hazardous materials are present, which pose a threat to children's health, children's learning abilities, public health or the environment (Ed. Code, § 17210, subd. (h)).

This section may also include other objectives or reasons as requested by the school district.

1.2 SCOPE OF WORK

The scope of work should provide a detailed scope of services conducted for the PEA, including assumptions, limitations and exceptions, special terms and conditions, and user reliance. This section should list the DTSC requirements or guidance complied with to meet the objectives of the PEA.

2.0 SITE DESCRIPTION

The site description should describe the physical setting of the site in relation to the surrounding area and include the following information:

- School site designation consistent with information submitted to CDE.
- Other site designations used historically.
- United States Environmental Protection Agency (U.S. EPA) identification number, if assigned.
- DTSC EnviroStor database number, if assigned.
- Street address or nearest cross streets, city or nearest community, county, state, zip code
- School district
- Size of the site (preferably in acres)
- Assessor's parcel number
- Township, range, section, and principal meridian
- Geographic coordinates (longitude and latitude)
- State Senate and Assembly districts
- Site and vicinity general characteristics: Climatic, topographic, geologic, hydrogeologic, and hydrologic.
- Current and historical uses of or operations on the site.
- Descriptions of improvements on the site.
- Current and historical uses of or operations on adjacent properties.

2.1 SITE HISTORY

The site history should be a summary based on the findings of the Phase I, including user provided information, records review, site inspections, and interviews. This should include business type, years of operation, prior land use, facility ownership/operators, property owners and surrounding land uses.

2.2 PREVIOUS ASSESSMENTS

This section of the report should include summaries of prior assessments or investigations, such as a Phase I report or other historical investigations. The documents should be adequately referenced to facilitate retrieval by another party. At a minimum, the summaries for prior assessments or investigations should include the following information:

- Site designation
- Street address or nearest cross streets, city or nearest community, county, state, zip code

- Size of the site (preferably in acres)
- Assessor's parcel number
- Township, range, section, and principal meridian
- Geographic coordinates (longitude and latitude)
- Purpose of the assessment or investigation
- Findings
- Conclusions and recommendations
- Review and approval by a regulatory agency

The area addressed in previous assessments should be correlated to the area of proposed school site to clearly demonstrate the spatial extent of each assessment and how it relates to the proposed school site. In some cases, a figure showing the spatial extent of each assessment or investigation may be useful.

3.0 RECOGNIZED ENVIRONMENTAL CONDITIONS

This section should present the recognized environmental conditions (RECs) identified in the Phase I (or after review of information consistent with a Phase I) to be addressed. The RECs should be clearly shown on a site plan (Figure 4).

3.1 CHEMICALS OF POTENTIAL CONCERN

This section should identify chemicals of potential concern associated with the RECs. Chemicals of potential concern should be identified based on research conducted during the Phase I (or review of information consistent with the Phase I) such as, advisories, guidance documents, process descriptions, hazardous materials data sheets, hazardous materials business plans, permits, and agency records. References for information sources used to identify chemicals of potential concern should be identified.

4.0 ENVIRONMENTAL SETTING

As part of the Phase I (or review of information consistent with a Phase I), information should have been collected regarding the site's environmental characteristics. This section should include descriptions of topographic, geologic, and hydrogeologic features associated with the site and surrounding areas.

The following sections should discuss potential pathways (soil, water, and air) of contaminant migration and environmental conditions which would influence the fate and transport of contaminants from the source through identified potential exposure pathways to the exposed individual or environmental receptor.

4.1 FACTORS RELATED TO SOIL PATHWAYS

The following factors related to soil pathways should be discussed:

1. Describe the topography of the site and the surrounding areas.
2. Describe any evidence of environmental impacts from releases at the site (e.g. stained soil, stressed vegetation, dead or ill wildlife, etc).
3. Describe the predominant soil groups for the site. Use site specific geologic logs, when available, that describe the lithologic materials present using the USCS classification system. Identify the least and most permeable continuous layers of soil and the permeability of each layer. Identify the presence of any artificial fill at the site, its thickness, lateral extent, and source.
4. Describe the surface slope at the site. Also, provide the slope of any intervening terrain between the site and the nearest downhill surface-water body. If the site is in a closed basin or surrounded by surface water, this fact should be stated.
5. Describe accessibility to the site in terms of both natural and man-made features or structures which currently restrict human access to the site.
6. Describe any measures which have been taken to contain or prevent direct contact with hazardous substances in or on the soil at the site.
7. Provide the distance to and location of the nearest potentially affected residential area, school, business, day care center, nursing home, senior citizen community, and hospital (for facilities within one mile of the site).

4.2 FACTORS RELATED TO WATER PATHWAYS

If a release or threatened release of hazardous substances to water (groundwater or surface water) exists at the site or from properties in close proximity to the site, then the following information should be provided.

4.2.1 Groundwater

The following factors related to groundwater pathways should be discussed:

1. Describe the hydrogeology beneath the site in terms of known aquifers, depth to aquifers, hydraulic conductivities, confining layers, discontinuities, aquifer interconnections, and any other features of significance.

2. Identify the aquifers which have been contaminated by a release from the site, or which are threatened to be contaminated as a result of migration of hazardous substances from a release at the site. Identify any aquifers which are interconnected with an aquifer that has been contaminated by a release from the site. Potential data sources include sampling data, local water districts and utilities, county health departments, Water Supply Branch of the Department of Health Services, Department of Water Resources, Regional Water Quality Control Board, and United States Environmental Protection Agency.

3. For each of the aquifers identified above, provide the following information for wells within a three-mile radius of the site. Potential data sources include sampling data, local water districts and utilities, county planning and health departments, local irrigation districts, Water Supply Branch of the Department of Health Services, Department of Water Resources, Regional Water Quality Control Board, and United States Environmental Protection Agency.

    a. Uses(s) of ground water from wells which draw from the aquifer(s) (e.g. drinking water, irrigation, industrial process water, etc.),
    b. Distances to the nearest well and nearest drinking water well which draw from the aquifer(s),
    c. Direction and velocity of flow within the aquifer(s),
    d. Approximate number of service connections and population served by drinking water wells from the aquifer(s).

4. Describe the possible migration route(s) from the areas of hazardous substance contamination and/or storage to nearby surface waters, marshlands, wetlands, or wildlife habitats in the event of surface water runoff or flooding. Potential data sources include personal observations, aerial photographs, local planning departments, Regional Water Quality Control Board, State Water Resources Control Board, Department of Fish and Game, United States Bureau of Reclamation, United States Geological Survey maps, and United States Fish and Wildlife Service.

5. Describe the locations and uses of surface waters, marshlands, wetlands, and wildlife habitats which may be potentially affected by migration of contaminants from the site. Also provide the location and distance to the nearest surface water, marshland, wetland, and wildlife habitat which may be affected by migration of the contaminants. Potential data sources include personal observations, aerial photographs, local planning departments, Regional Water Quality Control Board, State Water Resources Control Board, Department of Fish and Game, United States Bureau of Reclamation, United States Geological Survey maps, and United States Fish and Wildlife Service.

6. Describe any past or existing measures for preventing or mitigating surface water runoff from the site (e.g. berms, diversion systems, diking, sealed containers for hazardous substances, runoff collection systems, etc.). Potential data sources include facility records, personal observations, aerial photographs, local agencies, Regional Water Quality Control Board files, and DTSC files.

7. Identify the approximate population served (number of people drinking water) by each surface water intake within three (stream) miles downstream of the probable point of entry of runoff from a site to a stream/river and one mile from the probable point of entry to a static body of water. Also identify the approximate number of acres of food/forage cropland irrigated by water from each intake and the approximate number of livestock or poultry which consume water from each intake. Potential data sources include United States Census Bureau, local or regional planning and health departments, Drinking Water Supply Branch of the Department of Health Services, local irrigation districts, local watermasters, and Department of Water Resources.

4.2.2 Surface Water

The following factors related to surface water pathways should be discussed:

1. Describe, if applicable, Describe whether the surface water bodies including wetlands, river, streams, creeks, estuaries, bays etc. are located in proximity and whether the release(s) can potentially impact the surface water.
2. Describe contaminant concentration in upstream samples.
3. Provide floodplain information using USGS maps.
4. Describe hydrology including drainage patterns, flow, and surface/groundwater relationship.
5. Provide evaluation of contamination in sediments
6. Evaluate whether tidal or seasonal effects are significant to be considered in contaminant fate and transport
7. If applicable, provide impacts of the site to the sensitive environments 9e.g. habitat, wildlife etc.)

4.3 FACTORS RELATED TO AIR PATHWAYS

Information for this section needs to be provided only if sampling data exists to document a release of a hazardous substance to the atmosphere or if the threat of a release exists. The threat of a release exists if hazardous substances (including contaminated soils) on the site are subject to wind dispersal, evaporation, dispersal from fire/explosion, or if dispersal of the hazardous substances has been observed visually. If a release has been documented or a threatened release exists at the site, provide the following information.

1. Describe the known or potential source(s) and mechanism for the release or threatened release. Potential data sources include site records, local or regional air quality/pollution control districts.

2. Provide the daily prevailing wind direction and daily average velocity for the site. Potential data sources include local or regional air quality/pollution control districts, local weather stations.

3. Describe local climatic factors (e.g. seasonal temperatures, seasonal precipitation, seasonal temperature inversions, seasonal wind patterns, and seasonal extreme events). Potential data sources include local or regional air quality/pollution control districts, local weather stations.

4. Describe the timing of the release or threatened release (e.g., intermittent release related to facility operation, continuous release from an impoundment, potential release if heavy machines disturb soils, etc). Potential data sources include facility records, local or regional air quality/pollution control districts.

5. Describe the possible dispersion route(s) for a release or threatened release (e.g., via a stack emission, evaporation, wind, fire/explosion, etc). Potential data sources include facility records, local or regional air quality/pollution control districts.

6. Provide the approximate population of residents and workers which may be affected by a release or threatened release of hazardous substances. Potential data sources include United States Census Bureau, local or regional planning databases.

7. Provide the location and distance from the site to any of the following areas which may be impacted by a release or threatened release of hazardous substances. Potential data sources include local planning departments, United State Department of Food and Agriculture, Department of Water Resources, Department of Forestry maps.

    a. Commercial/industrial;
    b. National/state/county parks, forests, wildlife reserves;
    c. Residential areas;
    d. Agricultural lands (in production within five years) for both prime and non-prime agricultural land; and
    e. Historic/landmark sites.

8. If not previously indicated in other sections of the PEA report, provide the type, location, and distance from the release or threatened release of hazardous substances to the following sensitive environments. Potential data sources include local planning departments, maps, Department of Fish and Game Natural Diversity Database, Department of Water Resources, State Water Resources Control Board, Regional Water Quality Control Board, physical measurements.

    a. Schools

b. Day care centers
c. Hospitals
d. Nursing homes
e. Retirement communities
f. Any other sensitive populations
g. Coastal wetlands (within a two-mile radius);
h. Fresh-water wetlands (within a one-mile radius); and
i. Habitat for special species (within a one-mile radius).

5.0 CONCEPTUAL SITE MODEL

The conceptual site model (CSM) should include a narrative and graphical description of site characteristics, and should provide a foundation for understanding a site. The CSM integrates the areas of concern and chemicals of potential concern with the environmental setting at the site. The CSM should identify potential contamination sources and link them to potential receptors through release mechanisms, potential pathways, and exposure routes. The CSM should incorporate all essential features of the topographic, geologic, and hydrogeologic systems at the site. The degree of detail and accuracy of the CSM will vary according to the site setting and contaminant type(s). For simpler sites, the CSM may only include a discussion of areas of concern, a figure showing potential exposure scenarios (Figure 5A) and a site plan. For more advanced sites (e.g., sites with NOA or impacts to groundwater), a more detailed CSM will be necessary and may also include figures such as groundwater flow maps, iso-concentration drawings, geologic cross-sections, and detailed geologic maps of the surface and subsurface. Examples of such figures are included in Figures 5B through 5D.

The CSM is an iterative process. The initial CSM is used to develop the Field Sampling Plan (FSP) which is designed to determine the source of contamination, evaluate the migration potential and assess the exposure potential. As data gaps are identified and additional data is collected, the CSM should be revised. The resulting final CSM should be detailed enough to meet the characterization objectives, and provide enough information to make appropriate regulatory decisions.

6.0 DATA GAPS

Data gaps identified in the PEA Technical Memorandum or Workplan, based on the conceptual site model, should be presented in this section. Data gaps are missing information necessary to form conclusions and recommendations for the site that will ultimately lead to a regulatory decision. These data gaps should be used to form the objectives for and direct sampling activities.

7.0 SUMMARY OF SAMPLING ACTIVITIES

This section should describe how sampling activities were actually conducted in the field, present the analytical data, and provide discussion of the results. Explanations of variations from the PEA Technical Memorandum or Workplan should be integrated throughout this section and subheadings.

7.1 SAMPLING OBJECTIVES

The sampling objectives from the PEA Technical Memorandum or Workplan should be restated.

7.2 SAMPLING APPROACH

This section should describe the sampling approach utilitzed.

7.3 SAMPLING LOCATIONS AND RATIONALE

This section should repeat the sampling locations and rational presented in the DTSC-approved PEA Technical Memorandum or Workplan.

7.4 SAMPLE COLLECTION

This section should describe all equipment used to obtain samples.

7.4.1 Sampling Equipment and Procedures

This section should describe all equipment used to obtain samples.

7.4.1.1 DECONTAMINATION

A description of equipment and personnel decontamination and disposal of materials should be provided. Anything affecting the possibility of cross-contamination should be included.

7.4.1.2 PREPARATION

A description of the methods used to homogenize, split, and composite samples should be provided.

7.4.2 Containers and Preservation

This section should describe the sample containers and type of pre-cleaning method used. Documentation that containers were certified clean by the suppliers should be included in an Appendix C. This section should also identify the preservatives used for the different analyses.

7.4.3 Packaging and Shipment

This section should describe the methods used for labeling, sealing, packaging, and shipping samples.

7.4.4 Documentation

This section should present the following documentation described in the PEA Technical Memorandum or Workplan:

- Field logs
- Boring logs
- Chain-of-custody
- Photographs
- Field analysis documentation

Copies of this documentation should be provided in the appendices.

7.5 SAMPLE ANALYSES

This section should identify the field and laboratory analyses performed on each sample or group of samples. Analyses for each sample should be added to Table 1. The description of analyses should include preparation and analytical methods, analytes, quantitation limits, holding times, and preservation. Quantitation limits should be less than the screening value used for comparison.

7.5.1 Field

This section should discuss field analyses, such as x-ray fluorescence (XRF), including the preparation and analytical method, analytes, quantitation limits, holding times, and preservation.

7.5.2 Laboratory

This section should discuss laboratory analyses, including the preparation and analytical method, analytes, quantitation limits, holding times, and preservation.

7.6 ANALYTICAL RESULTS

The following subsections should summarize the analytical results from both field and laboratory analysis. Data reports for field analysis should be included in Appendix D and those for laboratory analysis should be included in Appendix E.

7.7 INVESTIGATION DERIVED WASTE

This section of the report should describe the management and disposition of wastes generated during the investigation, including soil cuttings, personal protective equipment, decontamination water, etc. Justification for the management and disposition of wastes should also be provided and should be consistent with the U.S. EPA Guide to Management of Investigation-Derived Wastes (U.S. EPA 1992).

Copies of any disposal documentation, such as hazardous waste manifests or bill of lading for non-hazardous waste, should be provided in Appendix G to the report.

7.8 FIELD CONDITIONS

Include a summary of the prevalent field conditions during the sampling activities. Field conditions sometimes can potentially impact the sampling activities in a number of ways. For example, in case of a rain event, soil gas sampling may be postponed until the field conditions are adequate for the sampling. Additionally, if the soil gas probes are flooded as a result of a recent rain event, it may not be possible to collect a sample.

7.9 FIELD VARIANCES

In most cases, DTSC-approved work plan will be followed to conduct field activities and field variation may not be needed, However, it is recognized that in some cases variance from the approved work plan may be necessary because of miscellaneous factors. The typical examples of variance may include:

- Any addition/deletion of the sampling location for soil, soil gas, groundwater, surface water, sediments, in case of access limitation and/or other physical constraints
- Modifications to the screen interval based on the review of geologic data in the field and/or final depth of the sample
- Addition and/or substitution of any analytical methods for based on the field observation
- Changes in depth of the sample based on the field observation and/or readings from the field instrument

In case a soil gas sampling probe is flooded because of a rain event, grab groundwater sampling may be appropriate in accordance with the PEA workplan.

8.0 QUALITY ASSURANCE

A quality assurance and quality control (QA/QC) program should be specified in Quality Assurance Project Plan (QAPP) to provide an appropriate level of assurance regarding the reliability and usability of the data generated during the proposed environmental sampling investigation. The QAPP should have been submitted with the PEA Workplan.

The overall QA/QC should ensure that sampling, analysis and reporting activities provide data quality consistent with the intended use. The QA objectives are to assure that the collected data will be accurate, precise, representative, and legally defensive. QC represents the specific steps and procedures to be followed during the course of the project to achieve QA. The primary QC features include collection and analysis of QC samples, field audit, and data validation.

As part of the QA/QC program, data validation should be conducted to evaluate performance of data collection against pre-determined methods, procedural, or contractual requirements specified in the FSP. It routinely assesses how closely the FSP has been followed during data generation in the field and laboratory. It checks for improper practices, abuse and warning signs shown during the sampling investigation.

The purpose of the data validation is to determine both the quality of the data based on compliance with all QA measures and the achievement of a project's data quality objectives (DQOs). It determines if the available data satisfies the project's DQOs and data use requirements by evaluating the data reports for field sampling procedures, laboratory performance and error checks. Data validation generally includes reviews of the following items:

- project QC program,
- sampling procedures,
- analytical procedures,
- data reports, and
- DQOs.

8.1 REVIEW OF PROJECT QC PROGRAM

The FSP should include a QC program for the proposed sampling and analysis. To ensure that data is of the highest confidence and known quality to satisfy the project objectives and to meet or exceed the requirements of the standard methods of analysis, review of the project QC program should include evaluation of the project's QC procedures and QC samples. Any deficiencies and impacts (e.g., deviations caused by

newly discovered site conditions) should be identified and discussed, and appropriate corrective actions recommended and taken.

8.1.1 QC Procedures

QC procedures, required to ensure that the site conditions and nature and extent of contamination are properly evaluated, include:

- adherence to strict protocols for field sampling and decontamination procedures;
- collection and laboratory analysis of appropriate field equipment and trip blanks to monitor for contamination of samples in the field or the laboratory;
- collection and laboratory analysis of matrix spike (MS), MS duplicate (MSD), and field duplicate samples to evaluate precision and accuracy; and
- attainment of completeness goals.

Evaluation criteria for basic QC procedures should include, but are not limited to, field decontamination, supplies, holding times, equipment calibration and maintenance, and standards, as described below:

- Field Decontamination: Non-dedicated equipment should be decontaminated before and/or after each sample collection. The equipment should be washed with a non-phosphate detergent, rinsed in potable water, and double rinsed with distilled water. A description of the specific methodologies followed to maximize proper equipment decontamination and with consideration for collection of equipment rinsate samples should be provided.

- Supplies: All supplies should be certified clean or new by the suppliers, inspected by the project team prior to their use, and monitored by the employed laboratory through the use of standards and blank samples as appropriate. Appropriate supplies, e.g., special water sample bottle for paraquat analysis, should be clearly specified. The description for sample collection and analysis contained in the methods should be used as a guideline for establishing the acceptance criteria for supplies.

- Holding Times: Holding time is the maximum time samples may be held prior to analysis and still be considered valid. It starts at the time of sample collection. Holding time for each analytical method and analyte should be provided and any holding time shorter than 30 days be clearly specified. If holding times are exceeded, and the analyses are performed, the associated results should be qualified.

- Preventative Maintenance and Standards: Analytical equipment should be properly calibrated and maintained as recommended by manufacturers and/or described in the employed laboratory's QA plan and Standard Operating Procedures (SOPs). Procedures specific to the calibration, use and maintenance of field equipment should be presented in the FSP. Standards used for laboratory equipment calibration or to prepare samples should be current, labeled with valid expiration

dates and certified by or traceable to National Institute of Standards and Technology (NIST) or other equivalent source. The laboratory's documentation of compliance and raw data should be made available to DTSC upon request and may be subject to audit by inspectors of the oversight agency and/or ELAP. The laboratory QA plan and SOPs should be included in the FSP or maintained in the project file.

8.1.2 QC Samples

To check for precision and accuracy of project data, appropriate QC samples should be collected for analysis at the specified frequency. These include field QC samples, background samples, split samples, field measurement confirmation samples, laboratory QC samples and/or positive confirmation samples. QC samples for soil gas investigations are specifically specified in DTSC's "Advisory – Active Soil Gas Investigations, dated January 28, 2003" (or its current version). QC samples for other investigations are discussed below. All proposed sample locations (including QC samples) should be identified and a rationale provided for the choice of location in the FSP.

8.1.2.1 FIELD QC SAMPLES

Field QC samples, used to evaluate conditions resulting from field activities, include blanks (for assessment of field contamination) and duplicates (for assessment of sampling variability). They should be samples expected to contain moderate levels of contamination and should be collected, preserved, packaged, stored, transported, and analyzed in a manner consistent with site samples. Field QC samples should be sent to the laboratory blind.

Field duplicates should be collected from areas of known or suspected contamination at a rate of at least 10 percent (%) of primary samples collected per analyte per sample matrix per event.

Common blanks are equipment rinsate blanks, field blanks, trip blanks and temperature blanks as described below:

- Equipment Rinsate Blanks: When decontamination of re-useable, non-disposable sampling equipment (e.g., hand augers, direct push rods, groundwater sampling pumps) is necessary, at least one (1) equipment rinsate blank per analyte per day (per 10 samples?) should be collected by pouring de-ionized or distilled water through the decontaminated or cleaned sampling equipment used for sampling.

- Field Blanks: When no equipment decontamination is required at all (e.g., utilization of one-time-use spoons for surface sampling or direct collection of groundwater samples from existing well valves), at least one (1) field blank per sample matrix per analyte per day should be collected by pouring de-ionized distilled water (or proper sampling medium standards as necessary) into a sample container at a specific sampling point.

- Trip Blanks: When transportation and offsite analysis of volatile organic compound (VOC) samples are needed, at least one (1) trip blank per sample matrix should accompany every shipment of blank containers shipped to the field and VOC samples shipped from the field (except for canister samples of VOCs or otherwise specifically exempted by the oversight agency). Trip blanks should be obtained by filling appropriate sample containers with clean medium which are free of VOCs and in the same matrix of site VOC samples.

- When temperature variation is critical to sample integrity (e.g., when low temperature sample preservation is required), one (1) temperature blank, consisting of a 40 milliliter (mL) VOA vial of clean water labeled "temperature blank," should be included in each shipment cooler.

8.1.2.2 BACKGROUND SAMPLES

A minimum of four (4) background sample locations per medium should be chosen from non-impacted, upgradient, upwind and upstream areas (with similar strata to proposed sampling locations) onsite or near the site. Background metal data from a nearby site with similar strata conditions may be utilized instead. However, collection of background lead and arsenic samples may not be required because DTSC's initial screening values for lead and arsenic in soil at school sites can be utilized for data interpretation and screening risk evaluation, unless it is wanted to differentiate between onsite and offsite contributions to contamination. In addition, risk assessment calculations should be made with all detected naturally occurring compounds, with the exception of lead and arsenic, assumed to be chemicals of potential concern (COPCs).

8.1.2.3 SPLIT SAMPLES

Split samples are samples that physically divided (or co-located when volatilization is not a problem) and analyzed by different laboratories for the purpose of providing an inter-laboratory or inter-organization comparison. For example, metal samples may be divided in half after being homogenized thoroughly in a pail. DTSC or interested parties (e.g., potential responsible parties, property owners, or community members) may request split samples for performing independent analyses.

8.1.2.4 FIELD TEST CONFIRMATORY SAMPLES

When field instrument is used for measurements, e.g., x-ray fluorescence (XRF) is used for lead analysis or handheld instrument is used for methane measurement, field test confirmatory samples should be collected in addition to routine QC samples (e.g., duplicates and standard samples). Follow the appropriate DTSC guidance documents for number and frequency of field test confirmatory samples.

8.1.2.5 LABORATORY QC SAMPLES

As part of standard laboratory QC protocols, each laboratory monitors the performance (precision and accuracy) of the results of its analytical procedures through analyses of laboratory QC samples as specified in the laboratory QA plan/SOPs and the analytical method requirements. Laboratory QC samples include method blanks, reagent spikes,

laboratory duplicates, laboratory control spike (LCS) samples, matrix spikes (MS) and matrix spike duplicates (MSD), surrogate compounds, positive confirmation samples, initial and continuing calibration checks, tuning checks, and/or performance evaluation (PE) samples. Required laboratory QC samples for each project should be identified and additional sample amount (e.g., a double or triple volume) collected for that purpose to avoid collection of a separate sample for laboratory QC purposes. Any samples with visual sign of contamination should be noted to the employed laboratory for possible preparation of laboratory QC samples.

The requirements for laboratory QC samples vary. However, the frequency for laboratory QC samples should be at least one (1) per batch of up to 20 total samples (including blanks and duplicates), five percent (5 %) of the primary field samples or 14 days, whichever requires greater number of laboratory QC samples. Common laboratory QC samples are described below.

- Method Blanks: Method blank at the specified frequency should be analyzed to assess the level of background interference or contamination in the analytical system (during sample preparation and analysis). When compounds are found in the blank, their values are evaluated to determine their effect on the analysis of environmental samples.

- MS and MSD Samples: MS and MSD pair at the specified frequency should be analyzed to evaluate the precision and accuracy of the procedures and to check sample matrix interferences.

- LCS Samples: LCS samples are clean matrices (e.g., reagent water or a clean solid such as sand, glass beads, or sodium sulfate) that have been spiked with a known quantity of a compound or group of compounds and are processed with every analytical batch of environmental samples. The percentage of the compound that is recovered in the analysis provides a measure of method accuracy. When analysis of the LCS is repeated, the standard deviation provides a measure of analytical precision. LCS sample at the specified frequency should be analyzed.

- Laboratory Duplicates: When the MS/MSD pair does not meet the precision or accuracy requirements or otherwise as appropriate, laboratory duplicate at the specified frequency should be prepared and analyzed in the laboratory.

- Positive Confirmation Samples: For samples detected positive with certain analyte (e.g., perchlorate), the presence of the analyte in the positive samples may need to be analyzed and confirmed by a more sensitive method. See appropriate methods or regulatory guidance for appropriate requirements.

- Performance Evaluation (PE) Samples: Standard or project-specific PE samples may be submitted to the analytical laboratory during any site investigation to assess the precision and accuracy of analytical procedures employed for a given sample set. PE samples may be submitted for analysis as part of the laboratory pre-

qualification process for a given sampling event. If questionable data quality is suspected as determined during laboratory audits or data validation, PE samples should be used. Results will be reported to the laboratory and presented with associated field sample results.

8.2 REVIEW OF SAMPLING PROCEDURES

Field activities should be planned, conducted and completed in a manner consistent with the FSP and be monitored through a field audit and photo documentation. Review of sampling and handling procedures should involve evaluation of utility clearance, field tests, field documentation, boring logs, sample conditions, investigation derived waste (IDW) management, and field audits.

Proper utility clearance should be completed prior to initiating any soil intrusion work. Field tests may be used in conjunction with confirmation samples analyzed in a fixed laboratory. Specific field analyses for pH, conductivity, turbidity, or others (e.g., immunoassay tests, XRF tests, soil gas investigations) should be discussed in the FSP.

Field logs and other documentations should be reviewed regarding sampling procedures, e.g., sample containers, collection, preservation, packaging, transportation, receipt, handling and storage, sample identification, chain of custody, holding time, and decontamination procedures. Upon receipt, the employed laboratory should inspect sample conditions and report the information accordingly on the chain of custody forms. Boring logs for any boring depth of 5 feet or deeper should be prepared under supervision of a California registered professional (e.g., professional civil engineer or geologist) in accordance with the California Business and Professions Code.

IDW should be managed as hazardous waste until proven otherwise or until specifically approved by DTSC as being non-hazardous waste. IDW should be properly drummed, labeled and securely onsite until an appropriate means of disposal can be determined. To ensure appropriate disposal of IDW, the average levels of all analytical results may be used to determine whether the IDWs are hazardous waste.

During the course of field work, routine field audits should be conducted. DTSC will also provide field oversight to spot check field work.

8.3 REVIEW OF ANALYTICAL PROCEDURES

The FSP should discuss the analyses requested, analytes of concern, turnaround times, and available laboratories. Review of analytical procedures includes laboratory accreditation, analytical methods, laboratory QC samples, internal standards, retention time windows, reporting limits, instrument calibration, tentatively identified compounds (TICs), and laboratory audits.

- The employed laboratory shall be ELAP or NELAP certified for the analysis requested unless no such certification is available for the analysis.

- It is DTSC's policy to use only the test methods found in SW-846 and California Code of Regulation, Title 22, for analysis of hazardous constituents, unless otherwise specifically allowed by DTSC. All analyses should be performed as specified in the requirements of DTSC-approved analytical methods and the employed laboratory's standard operating procedures (SOPs) and QA plan.

- The common laboratory QA/QC procedures include method blanks, surrogates, matrix spike and matrix spike duplicates, laboratory duplicates and initial and continuing calibration checks.

- If the internal standard recovery falls outside of acceptable criteria, the instrument should be checked for malfunction and reanalysis of the sample should be performed after any problems are resolved.

- Retention times should be checked on a daily basis. If the retention time for an analyte falls outside its respective window, the instrument should be recalibrated and the affected samples be reanalyzed.

- Review of surrogates, retention time window and TICs is not necessary for inorganic analyses.

- All collected samples should be delivered to the employed laboratory for appropriate analyses immediately after their collection. Samples not analyzed immediately should be archived by the laboratory for possible later analysis.

- Laboratory audits include reviews of sample handling procedures, internal sample tracking, SOPs, analytical data documentation, QA/QC protocols, and data reporting. If no previous audit has been conducted, a scheduled audit should be considered prior to selection of the laboratory or after discovery of significant laboratory discrepancies.

8.4 REVIEW OF DATA REPORTS

All laboratory reports should be comparable with previous USEPA Level II contract laboratory documentation. All data should be reviewed in accordance with the project sampling and analysis workplan, the employed laboratory's standard operating procedures (SOPs), the principles present in USEPA National Functional Guidelines for Laboratory Data Review – Organics (USEPA, 1999) and Inorganics (USEPA, 2002), and the professional judgment of the project validation team to ensure that the data produced are credible, cost-effective, and of known and defensive quality. The areas of data review should include:

- Completeness of the laboratory reports (e.g., laboratory/client/sample identifications, ELAP certification number, project name, sample matrix, analytes, analytical methods, sample collection/preservation/preparation/extraction/analysis dates, reporting units/limits, dilution factors, report page numbering system, designated title and signatures);

- Chain of custody;
- Analytical methods and reporting limits;
- Sample containers and conditions;
- Holding times;
- Sample preservation;
- Field QC samples (e.g., equipment blanks, field blanks, trip blanks, temperature blanks, duplicates, split samples, as applicable);
- Laboratory QC samples (e.g., method blanks, laboratory control samples, matrix spike and matrix spike duplicates. duplicates, as applicable);
- Surrogate recoveries (as applicable for organic analyses only);
- Compound identification and quantification;
- Dilution factors;
- Data qualifiers;
- Tentatively identified compounds (TICs);
- Confirmation of positive samples, as applicable
- Observations regarding any occurrences which may adversely affect sample integrity or data quality; and
- Case narrative describing all qualified data, TICs, variances, deviation or deficiencies encountered (during field sampling or laboratory analysis), possible reasons (with verifications), potential impacts, and corrective actions taken, if any.

If elevated levels of non-target compounds or TICs are detected, such as other heavy metals have been detected during the analysis of lead samples by Method 6010C, these non-target compound data should be discussed with DTSC before the data is included in the investigation report and submitted to DTSC for approval.

When significant discrepancies of analytical results are identified, a data audit should be performed to review the complete raw data files and supporting documentation, including verification of data calculations for calibration and QC samples. The data audit will determine if the deviations will result in any adverse effect on the project conclusions and if a corrective action is necessary.

8.5 REVIEW OF DATA QUALITY OBJECTIVES (DQOS)

Data quality objectives (DQOs) are qualitative and quantitative statements for establishing the criteria for data quality and for developing data collection designs. DQOs also establish the acceptable or appropriate levels of uncertainty associated with a set of data. Data quality may need to be legally defensible or simply capable of determining only the “presence-absence” question.

USEPA’s systematic planning guidance, “Guidance for the Data Quality Objectives Process (EPA QA/G-1, August 2000) should be used to define how environmental data will be used for environmental decision making. The seven steps of the DQO process are:

- State the Problem;

- Identify the Decision;
- Identify Inputs to the Decision;
- Define the Study Boundaries;
- Develop a Decision Rule;
- Specify Limits on Decision Error; and.
- Optimize the Design.

The "Specify Limits on Decision Errors" portion should contain supporting rationale for why the number of proposed samples and the proposed quality of the data are deemed appropriate for the data quantity and data quality needs. A statistical support, e.g., Visual Sample Plan available at http://dqo.pnl.gov/vsp, should be used to define a clear and defensible scientific rationale for the proposed sampling frequency.

The project DQOs should be evaluated to determine whether the quantitative and qualitative needs of the sampling and analysis program have been met. The DQOs should be specified in terms of specific data quality indicators (DQIs), i.e., precision, accuracy, representativeness, completeness, comparability, and reporting limits (RLs).

Qualitative DQIs are comparability and representativeness.

- Comparability expresses the confidence with which one data set can be compared to another for trends or changes (in space or time) at the site.

- Representativeness is the degree to which data accurately and precisely represent the actual site conditions through sufficient number of samples, appropriate sampling methodologies, necessary decontamination and proper QA/QC procedures.

Quantitative DQIs are precision, accuracy, completeness and RLs.

- Precision measures the reproducibility of repetitive measurements by assessing the standard deviation or relative percent difference (RPD) between analyses of the sample and the duplicate. The RPD limit for laboratory QC samples and site data of appropriate media (soil, soil gas and groundwater) should be provided in the FSP. RPD is calculated:

  % RPD = 200% |Xr –Xd|/(Xr + Xd),
  where Xr is the measurement of the sample, and Xd is the measurement of the duplicate or replicate sample.

- Accuracy is a measurement of correctness by comparing a sample measurement with a known value. Field accuracy is achieved if no contamination is detected in equipment rinsate and trip blanks. Laboratory accuracy is achieved if all recoveries (expressed as the % recovery) of laboratory QC samples and initial and continuing calibrations of instruments are reported within the corresponding control ranges.

- Completeness is the amount of valid usable data obtained compared to the amount expected under ideal conditions. Completeness may be affected by such factors as sample bottle breakage and acceptance/non-acceptance of analytical results. At least 90% of the planned data results should be obtained and valid. Completeness is calculated:

  % completeness = 100% · (number of valid results) ÷ (number of planned results)

- Reporting Limits (RLs) should be low enough to 1) evaluate detected compounds against the screening levels, and 2) eliminate undetected compounds for further consideration in a quantitative risk assessment. As appropriate, screening levels may be risk-based criteria calculated in accordance with DTSC's guidance documents or published values, such as the California Human Health Screening Levels (CHHSLs) established by the California Office of Environmental Health Hazard Assessment (OEHHA), the Preliminary Remediation Goals (PRGs) by USEPA Region IX (including the Cal/EPA-modified PRGs), the Environmental Screening Levels (ESLs) by the San Francisco Bay Regional Water Quality Control Board, or regulatory standards. The planned RLs for soil gas samples should comply with the DTSC's Advisory – Soil Gas Investigations.

If matrix bias is suspected, the associated data may be qualified (as estimates or appropriate) and the direction of the bias indicated in the data validation report. If the DQOs or criteria are not fully achieved, such variances will trigger appropriate QA/QC measures needed to evaluate and correct the activities, as necessary; however, the data may not be considered invalid.

8.6 DATA VALIDATION MEMORANDUM

A data validation memorandum should be prepared by a qualified professional (e.g., laboratory director or chemist, project manager or QA/QC manager) to summarize the findings of a Level II data validation for all analytical results and included as Appendix F in the report. A sample Data Validation Memorandum is posted on DTSC webpage: http://www.dtsc.ca.gov/Schools/upload/Data_Validation.pdf. See the sample Data Validation Memo for more detailed requirements.

9.0 HEALTH AND SAFETY

This section should demonstrate compliance with Health and Safety Plan submitted in either the PEA Technical Memorandum or Workplan by providing field notes and logs. This section of the report should describe the health and safety procedures that were followed in the field, including safety equipment and clothing used (personal protective equipment, level of protection), health and safety meetings, explanation of any hazards encountered, and any instrument readings recorded. If x-ray fluorescence was used for lead sampling and analysis, qualification of the operator, standard operating procedures notes and compliance with radioactive safety requirements should be discussed in this section.

Any deviations from the Health and Safety Plan should also be identified.

10.0 ENVIRONMENTAL MIGRATION SCREENING EVALUATION

Consistent with the PEA Workplan, this section should present the approach used to evaluate potential impact to groundwater and surface water using tools such as U.S. EPA soil screening values [Reference], criteria developed by the Regional Water Quality Control Boards, leaching models, or leachability tests. Sampling results, contaminant characteristics, and the CSM should be evaluated together to determine the environmental fate and transport of contaminants. Selection of tools should consider the most conservative criteria. If surface water may be impacted, an ecological screening evaluation may be necessary.

11.0 HUMAN HEALTH SCREENING EVALUATION

[Human and Ecological Risk is preparing Section 11.0]

11.1 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

11.1.1 Comparison of Site Data with Background

11.2 SCREENING EVALUATION ASSUMPTIONS AND EXPOSURE FACTORS

11.2.1 Land Use Scenarios

11.2.2 Exposure Pathways and Media of Exposure

11.2.3 Chemical Groups

11.2.4 Exposure Point Concentrations

11.2.5 Indoor Air Evaluation

11.2.6 Toxicity Values and Summary Tables

11.3 RISK AND HAZARD CHARACTERIZATION

11.3.1 Selection of Pathways

11.3.2 Water Pathway

11.3.3 Soil Pathway

11.3.4 Air Pathway

11.3.4.1 PARTICULATES (OUTDOOR)

11.3.4.2 VAPOR (OUTDOOR)

11.3.4.3 VAPOR (INDOOR)

11.3.5 Summary of Risk and Hazard for All Media

Include summary tables

11.3.6 Uncertainty Analysis

11.4 SPECIAL HAZARDOUS MATERIAL CONSIDERATIONS

11.4.1 Anthropogenic

Consider polynuclear aromatic hydrocarbons, dioxins, and furans.

11.4.2 Arsenic

11.4.3 Lead

Include LeadSpread evaluation.

11.4.4 Methane and Hydrogen Sulfide

Include methane advisory and petrogenic, biogenic, thermogenic sources of hydrogen sulfide.

11.4.5 Naturally Occurring Asbestos

11.4.6 Petroleum Hydrocarbons

11.4.7 Radon

12.0 PUBLIC PARTICIPATION

Public participation activities conducted for the PEA should be described in the following subsections.

12.1 PUBLIC NOTICE FOR FIELD WORK

In accordance with Education Code, section 17210.1, subdivision (b), school districts are required to provide a notice to residents in the immediate area of the proposed school site, prior to the commencement of work at the site, utilizing a format developed by DTSC.

Describe how and when the PEA was public notice was posted and distributed and include the following documentation in Appendix H:

- Copy of the site-specific work notice
- Distribution address list as proof of service

12.2 PUBLIC COMMENT AND HEARING

In accordance with Education Code, section 17213.1, subdivision (a)(6), school districts have two options for making the PEA Report available for public review and comment. Both options require the school district to prepare a public notice that encourages public participation during the comment period.

Describe how and when the public notice was posed and distributed and include the following documentation in Appendix I:

The public notice should be distributed as follows:

- Copy of the site-specific public notice (in English and any other language used)
- Distribution address list as proof of service
- Proof of publication(s) in a general circulation local newspaper or regional section of a major metropolitan newspaper, if it is the only general circulation newspaper in the area.

Include a list of the documents placed in the information repositories and administrative record and when these documents were placed:

- PEA Report
- Any changes to the PEA requested by DTSC
- Any correspondence between the school district and DTSC relating to the PEA

Also, identify the option (A or B) that the school district will use to make the PEA Report available for public comment.

13.0 COMPLIANCE WITH ADDITIONAL REGULTORY REQUIREMENTS

This section should identify and discuss compliance with additional regulatory requirements identified in the PEA Technical Memorandum or Workplan. This section should also discuss compliance with other regulatory requirements identified after approval of the PEA Technical Memorandum or Workplan.

14.0 FINDINGS

This section should summarize the following findings of the PEA conducted to address RECs identified in the Phase I (or after review of information consistent with a Phase I):

- Nature and extent of contamination, determined thus far, based on sampling.
- Fate and transport based on the environmental migration screening evaluation.
- Human health risk based on the human health screening evaluation.

Based on these findings, the areas of concern (AOCs) and associated chemicals of concern should be identified. For each AOC, following information should be presented:

- Chemicals of concern.
- Extent to which the AOC has been characterized horizontally and vertically.
- Media impacted.

15.0 CONCLUSIONS AND RECOMMENDATIONS

This section of the report should include conclusions that summarize the evaluation of RECs identified in the Phase I (or after review of information consistent with a Phase I) and provide associated recommendations.

This section should contain one of the following conclusions and recommendations for the PEA (Ed. Code, § 17213.1, subds. (a)(4)(B), (a)(9) and (a)(10)):

- Further investigation is not required.
  - No release of hazardous material has occurred, there is no threat of a release of hazardous materials, and no naturally occurring hazardous material is present at the site.
  - Neither a release of hazardous material nor the presence of a naturally occurring hazardous material which would pose a threat to public health or the environment under unrestricted land use, was indicated at the site.
- Further action is required.
  - A release or threatened release of hazardous material or the presence of a naturally occurring hazardous material, which would pose a threat to public health or the environment under unrestricted land use, exists at the site.

Further action may include additional investigation (Ed. Code § 17213.1, subd. (a)(10)) in the form of a Supplemental Site Investigation (SSI) to characterize the nature and extent of any environmental condition or chemical contamination determined to pose an unacceptable risk to human health or the environment.

In some cases, the data generated during the PEA is sufficient to determine that an RI/FS or response action, such as a removal or remedial action, is necessary. These actions are conducted in accordance with Health and Safety Code, division 20, chapter 6.8, section 25300 et seq. (Ed. Code § 17213.2, subd. (a)). A brief description of the recommended response action (e.g. excavation) should be provided.

In certain cases, DTSC may consider a partial site approval when a PEA concludes that with the exception of a small isolated area of contamination that requires a response action, a large portion of a site is not impacted. To recommend partial site approval for construction to proceed on portions of the site that are not affected by hazardous materials, all of the following conditions must be met and should be demonstrated in this section (Ed. Code, § 17213.2, subd. (f)(1)):

- Impacted portions of the site have been fully characterized.

- Construction will not interfere with any response action necessary to address the release or threatened release of hazardous materials, or presence of any naturally occurring hazardous materials.
- Site conditions will not pose a significant threat to the health and safety of workers involved with construction.

16.0 REFERENCES

The report shall include a references section to identify published referenced sources relied upon in preparing the PEA Report. Each referenced source shall be adequately annotated to facilitate retrieval by another party.

DTSC. 2006b. Data Validation Memorandum, Summary of the Level II Data Validation for Advanced Technology Report ATV5796, dated April 25, 2006." May 2, 2006.

United States Environmental Protection Agency (U.S. EPA). 1992. *Guide to Management of Investigation-Derived Wastes, Quick Reference Fact Sheet.* Office of Solid Waste and Emergency Response. Publication 9345.3-03FS. January 1992.

17.0 SIGNATURE AND QUALIFICATIONS OF ENVIRONMENTAL ASSESSOR

The environmental assessor responsible for the PEA shall sign the document and include the following information as proof of qualifications:

- Class II Registered Environmental Assessor (REA): REA Number, signature, and expiration date.
- Professional Engineer registered in the State of California (civil (including geotechnical and structural), electrical, and mechanical): License number, signature, seal or stamp, and expiration date (Bus. & Prof. Code, §§ 6735, 6735.3, and 6735.4).
- Professional Engineer registered in the State of California (agricultural, chemical, control system, corrosion, fire protection, industrial, manufacturing, metallurgical, nuclear, petroleum, or traffic): License number, signature, and optional seal or stamp.
- Professional Geologist registered in the State of California: License number, signature, seal or stamp, and expiration date (Bus. & Prof. Code, § 7835).
- Certified Engineering Geologist registered in the State of California: License Number signature, seal or stamp, and expiration date (Bus. & Prof. Code, § 7835).
- Licensed Hazardous Substance Contractor: Contractor's license number, HAZ (Hazardous Substance Removal) certification, signature, and expiration date.

In addition to the qualifications identified above, an environmental assessor must also possess at least at least three years of experience in conducting PEAs (Ed. Code, § 17210, subd. (b)). As proof of qualifications, the number of years of relevant experience for the environmental assessor should be identified in this section.

Similar to ASTM Practice E 1527 (ASTM 2005) for Phase Is, this document should include the following statement of the environmental assessor(s) responsible for preparing the PEA Report:

"[I, We] declare that, to the best of [my, our] professional knowledge and belief, [I, we] meet the definition of environmental assessor as defined in and have the experience required by Education Code, section 17210, subsection (b)."

In addition to qualifications and experience required to work on school sites, requirements exist for specific work that may be conducted during environmental assessments, investigations, or cleanup of school sites:

- All engineering work shall be conducted in compliance with the Professional Engineers Act (Bus. & Prof. Code, § 6700 et seq.) and Rules of the Board for Professional Engineers and Land Surveyors (Cal. Code Regs., tit. 16, § 400 et seq.).
- All geologic work shall be conducted in compliance with the Geologist and Geophysicist Act (Bus. & Prof. Code, § 7800 et seq.) and Rules of the Board for Geologists and Geophysicists (Cal. Code Regs., tit. 16, § 3000 et seq.).
- Contractors engaging in removal or remedial actions must be a licensed hazardous substance contractor with the Contractors' State License Board (Bus. & Prof. Code § 7058.7).

FIGURE 1 SITE LOCATION MAP

This map should include a north area, be to scale, and show the general location of the site relative to its surrounding area, including major highways, surface water bodies, land use, sensitive populations, and critical habitats.

[Include Figure 1 from Appendix B – Phase I.]

FIGURE 2 SITE VICINITY MAP

This map should include a north arrow, be to scale, and be of sufficient detail to show adjacent property uses.

[Include Figure 2 from Appendix B – Phase I.]

FIGURE 3 SITE PLAN

This plan should include a north arrow, and be to scale, and be of sufficient detail to show significant site features, including site boundaries, land use, paved areas, structures, drainage patterns, areas of known or suspected environmental conditions, and recognized environmental conditions.

Copy from Appendix E – PEA Workplan

FIGURE 4 RECOGNIZED ENVIRONMENTAL CONDITIONS

The recognized environmental conditions should be clearly shown overlaid onto the site plan.

FIGURE 5 CONCEPTUAL SITE MODEL

Examples of figures used to show the conceptual site model of the site may include, but are not limited to, the following:

- Figure 5A – Potential Exposure Scenarios
- Figure 5B – Iso-concentration Contour Map
- Figure 5C – Groundwater Elevation Contour and Flow Map
- Figure 5D – Geologic Cross-Section

Use of these figures will depend on the complexity of the site.

FIGURE 6 SITE PLAN WITH SAMPLING LOCATIONS AND RESULTS

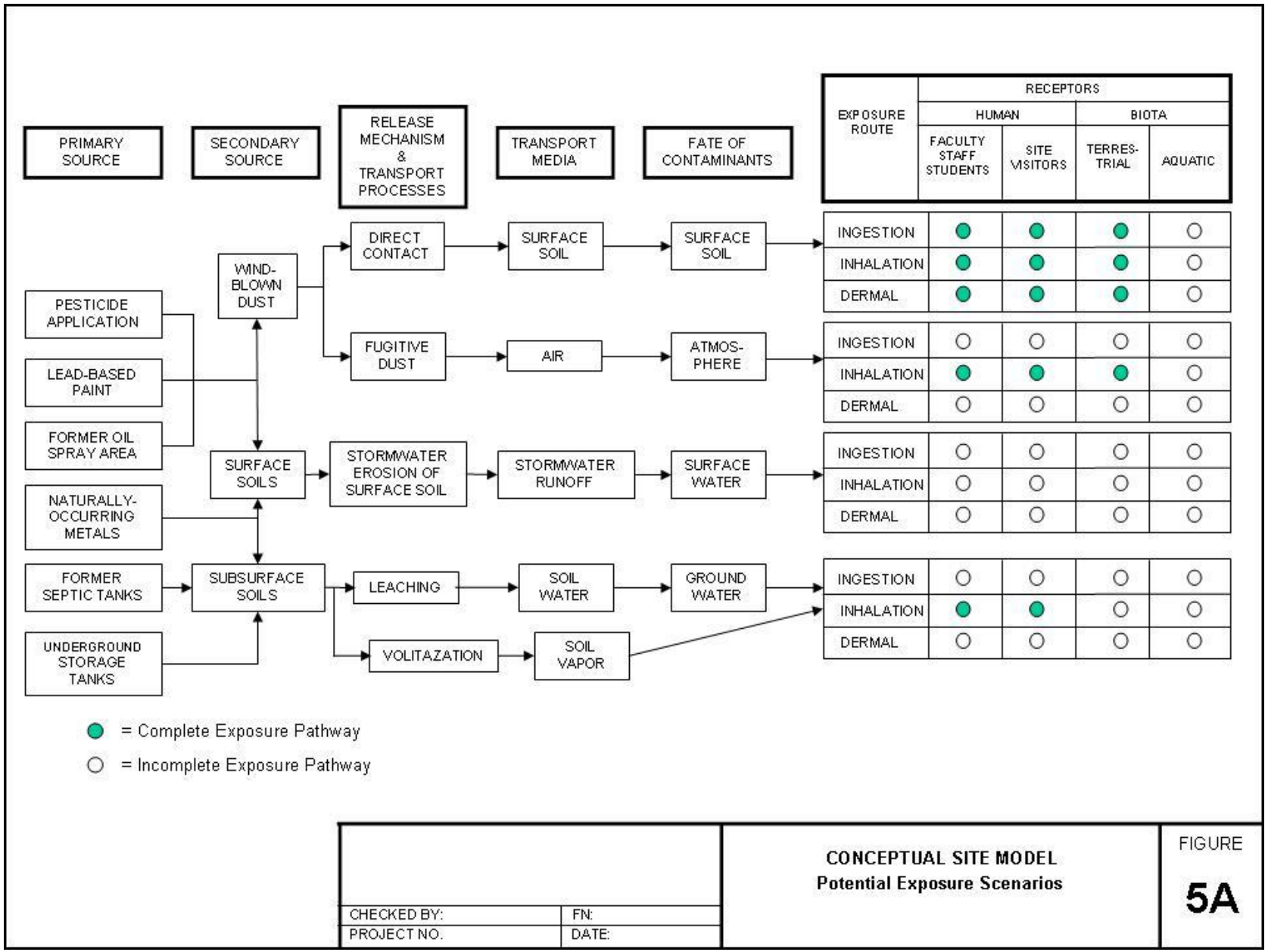
This figure should show the samples collected and the associated analytical results overlaid onto the Site Plan. The figure should clearly show the sampling locations relative to the areas of recognized environmental conditions. The sample locations,

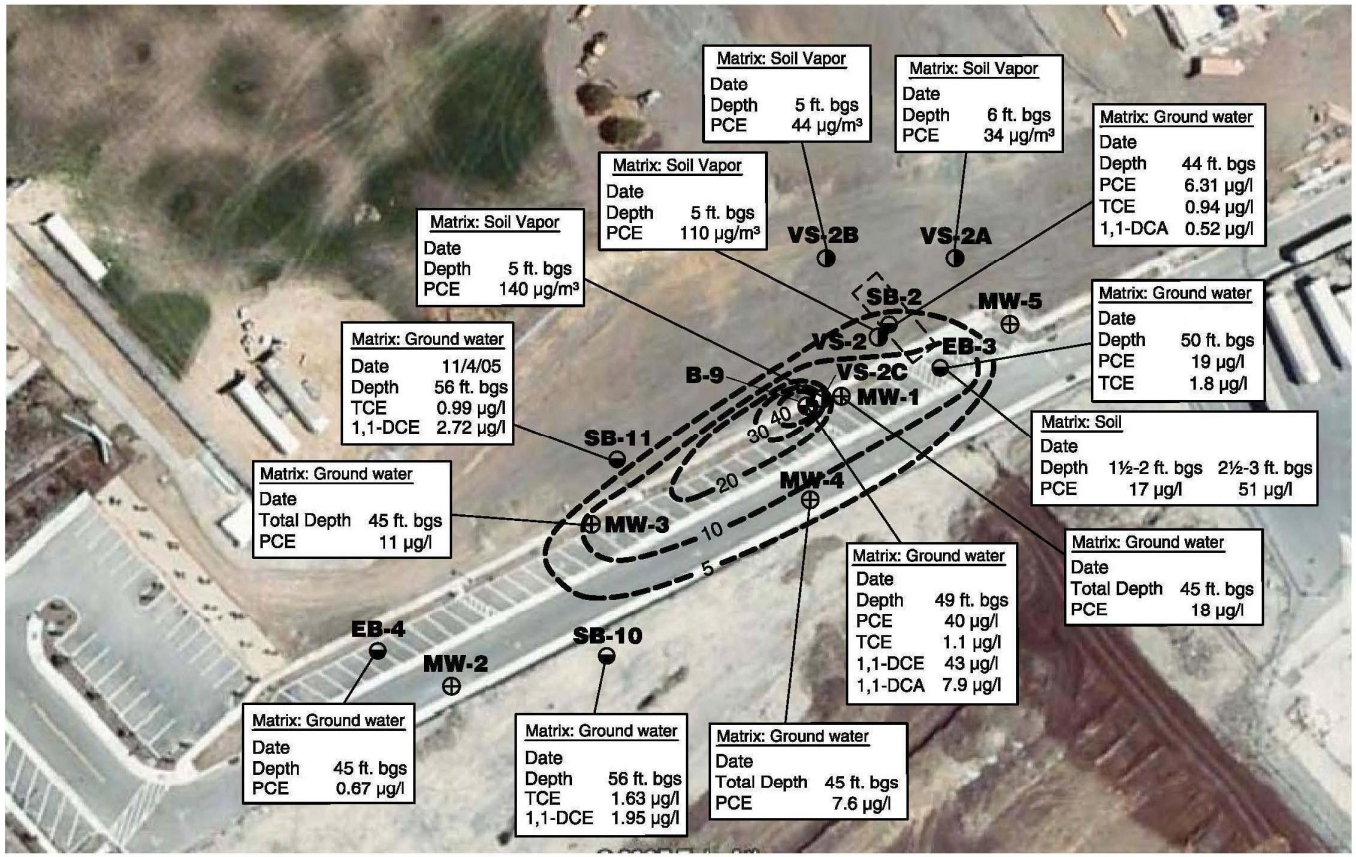
depths, matrix, analytes, detected concentrations, detection limit for non-detect concentrations, and concentration units should be clearly presented.

[Include an example that is based on Figure 3.]

FIGURE 7 PROJECT SCHEDULE

[Include an example.]


PRIMARY SOURCE
SECONDARY SOURCE
RELEASE MECHANISM & TRANSPORT PROCESSES
TRANSPORT MEDIA
FATE OF CONTAMINANTS
EXPOSURE ROUTE
RECEPTORS
HUMAN
BIOTA
FACULTY STAFF STUDENTS
SITE VISITORS
TERRES-TRIAL
AQUATIC
PESTICIDE APPLICATION
LEAD-BASED PAINT
FORMER OIL SPRAY AREA
NATURALLY-OCCURRING METALS
FORMER SEPTIC TANKS
UNDERGROUND STORAGE TANKS
WIND-BLOWN DUST
SURFACE SOILS
SUBSURFACE SOILS
DIRECT CONTACT
FUGITIVE DUST
STORMWATER EROSION OF SURFACE SOIL
LEACHING
VOLITAZATION
SURFACE SOIL
AIR
STORMWATER RUNOFF
SOIL WATER
SOIL VAPOR
ATMOS-PHERE
SURFACE WATER
GROUND WATER
INGESTION
INHALATION
DERMAL
= Complete Exposure Pathway
= Incomplete Exposure Pathway
CHECKED BY:
FN:
PROJECT NO.
DATE:
CONCEPTUAL SITE MODEL
Potential Exposure Scenarios
FIGURE
5A



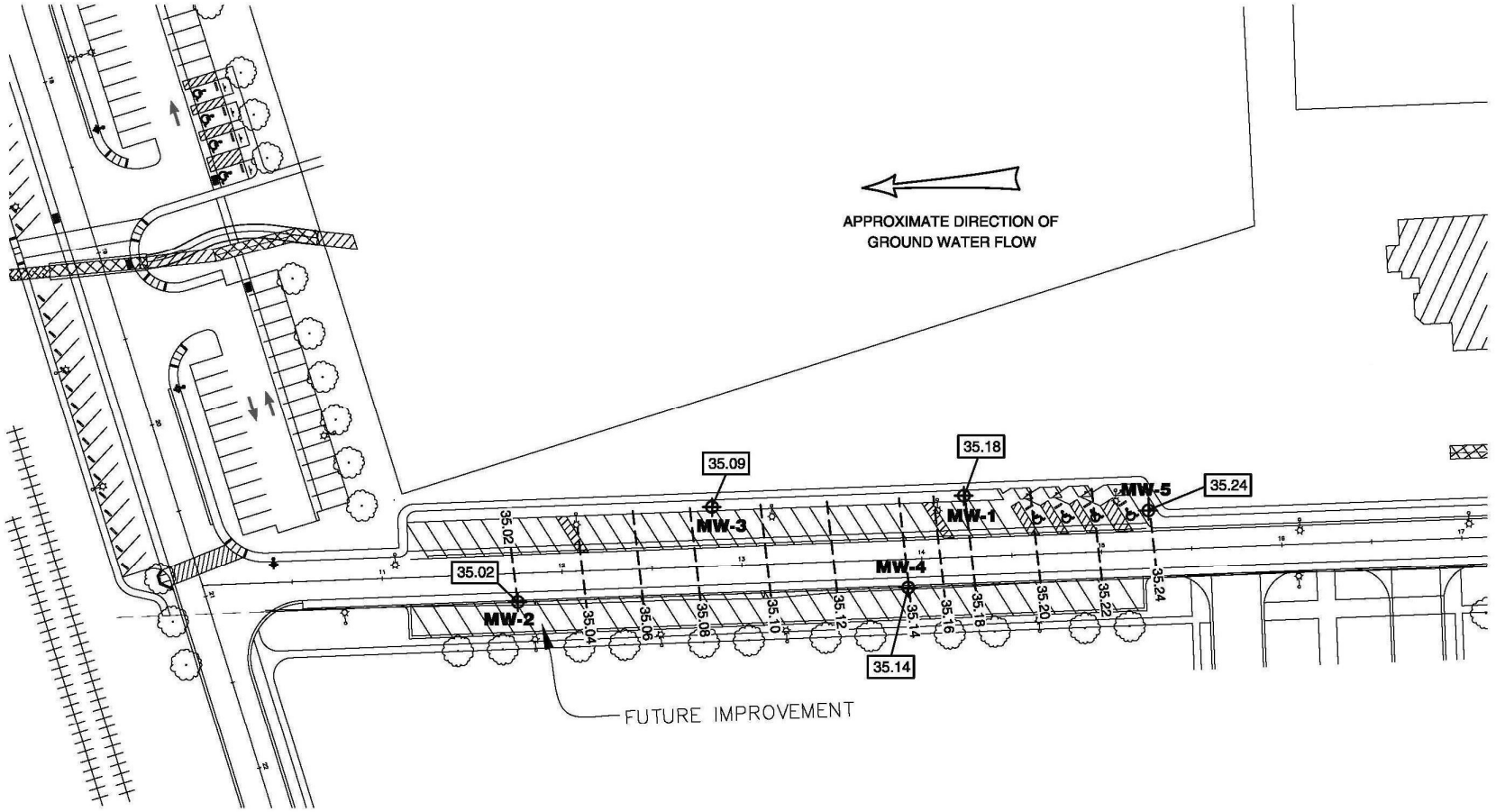
LEGEND

⊕ - Approximate location of ground water monitoring well
◑ - Approximate location of soil vapor sample
⊕ - Approximate location of boring
⊖ - Approximate location of boring
[ ] - Former rail spur/solvent compound building
— 10 — - Iso-concentration contour of PCE in µg/l

0 60 ft.

CONCEPTUAL SITE MODEL
Iso-Concentration Contour Map

FIGURE
5B



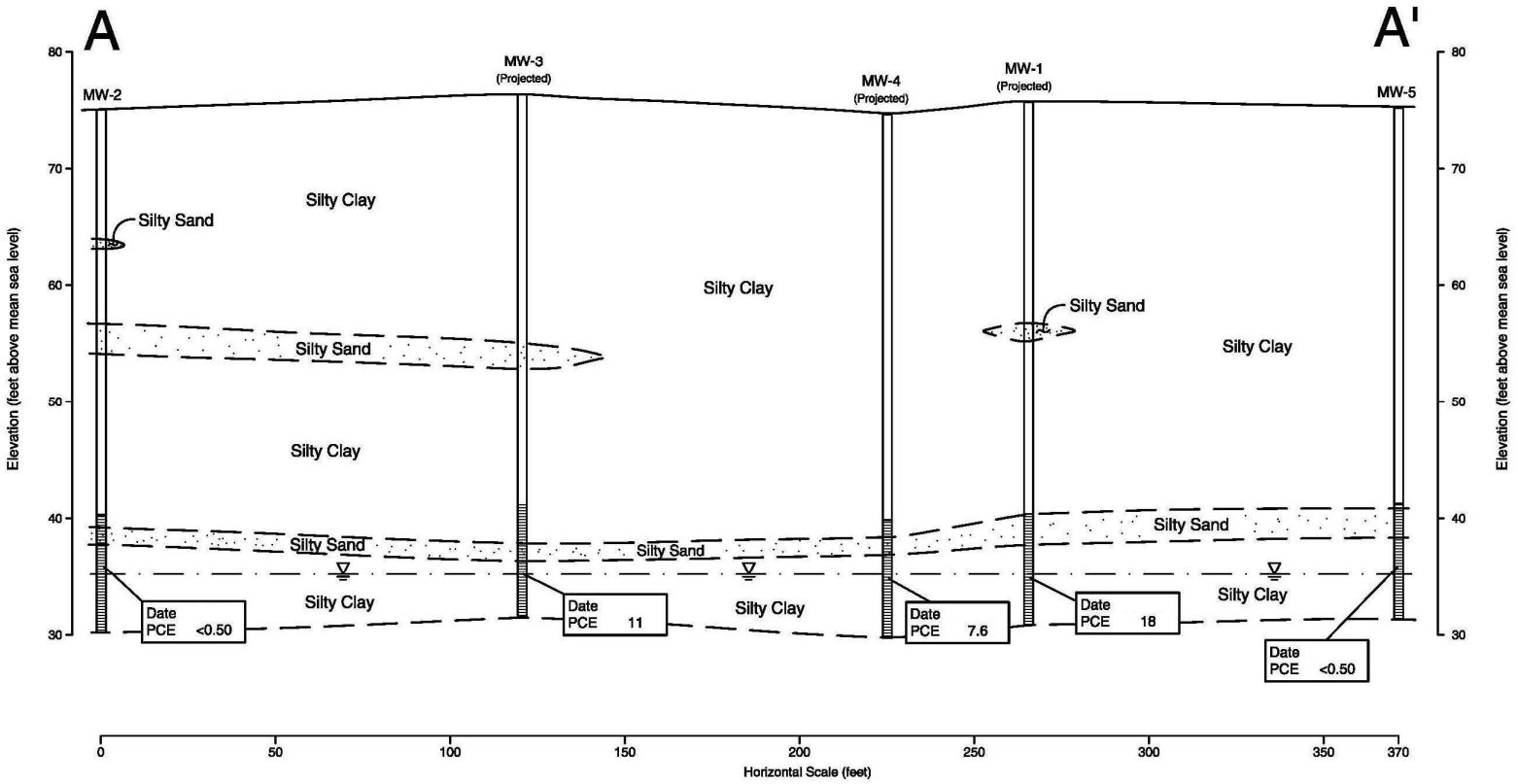
LEGEND

⊕ - Approximate location of monitoring well

35.04 — — - Ground water elevation contour (ft mls) - 0.02 ft intervals

CONCEPTUAL SITE MODEL
Groundwater Contour and Flow Map

FIGURE
5C



LEGEND

- Silty Sand
- Silty Clay
- Approximate elevation of water table

CONCEPTUAL SITE MODEL
Geologic Cross-Section

FIGURE
5D

TABLE 1 SUMMARY OF SAMPLING LOCATIONS AND RATIONALE

Copy Table 1 from Appendix C – Phase I Addendum.

TABLE 2 SUMMARY OF ANALYTICAL RESULTS

This table should provide a summary of the analytical results. The analytical method, sample locations, depths, matrix, detected concentrations, detection limit for non-detect concentrations, and units should be clearly presented. The table should also compare results to the screening level for lead and identify the detected concentrations exceeding the screening level.

Copy Table 2 from Appendix C – Phase I Addendum.

TABLE 3 SUMMARY OF RISK

Develop a standard risk summary table that can be presented in both PEA and SSI reports.

TABLE 4 SUMMARY OF HAZARD

Develop a standard hazard summary table that can be presented in both PEA and SSI reports.

OTHER TABLES TO CONSIDER:
Summary of Sensitive Receptors
Summary of Sampling and Analysis Program, Soil Gas Sampling
Summary of Sampling and Analysis Program, Soil Sampling
Summary of Sampling and Analysis Program, Groundwater Sampling
Summary of Detections, Soil Gas Sampling
Summary of Detections, Soil Sampling
Exposure Point Concentration Summary
Selection of Chemicals of Potential Concern
Statistical Analysis of Metals in Soil
Cancer Slope Factors for Carcinogenic Chemicals of Potential Concern
Non-Carcinogenic Reference Doses for Chemicals of Potential Concern
Intake Parameters Used to Estimate Exposure for Adult Residents
Intake Parameters Used to Estimate Exposure for Child Residents
Cumulative Hazard Index Resulting from All Exposure Routes, Adult Residents
Cumulative Hazard Index Resulting from All Exposure Routes, Child Residents
Cumulative Cancer Risks Resulting from All Exposure Routes

APPENDIX A SITE PHOTOGRAPHS

Copy description from Appendix B in Appendix C – Phase I Addendum.

APPENDIX B FIELD LOGS

Should include logs used to comply with the Health and Safety Plan

APPENDIX C BORING LOGS

APPENDIX D X-RAY FLUORESCENCE DATA REPORTS

Copy description from Appendix D in Appendix C – Phase I Addendum.

APPENDIX E LABORATORY REPORTS AND CHAIN-OF-CUSTODY DOCUMENTATION

Copy description from Appendix E in Appendix C – Phase I Addendum.

APPENDIX F DATA VALIDATION MEMORANDUM

Copy description from Appendix F in Appendix C – Phase I Addendum.

APPENDIX G WASTE MANAGEMENT DOCUMENTATION

Uniform hazardous waste manifests or bill of lading for investigation-derived waste should be included and referenced in the text.

APPENDIX H COPY OF PUBLIC NOTICE FOR FIELD WORK

APPENDIX I COPY OF NEWSPAPER NOTICE FOR PUBLIC COMMENT PERIOD AND PUBLIC HEARING FOR PRELIMINARY ENVIRONMENTAL ASSESSMENT REPORT

APPENDIX J TRANSCRIPT OF PUBLIC COMMENTS RECEIVED DURING THE PUBLIC HEARING

APPENDIX K VERIFICATION LETTER OF BOARD APPROVAL/RATIFICATION OF CEQA DOCUMENT FOR SCHOOL CONSTRUCTION

Make title of appendix consistent with letter template for approval of PEA Report, Option B.